

REMARKS/ARGUMENTS

Claims 1-35 are pending in the application. Claims 11, 12, 18, 29, 31 and 34 are amended, and a brief overview of these amendments is presented for the Examiner's convenience.

Claim amendments

Claims 11 and 12 are amended to define the variables set forth in claims 11 and 12. Claim 11 has been further amended to refer to Figure 7 in order to correct a typographical error.

Support for these amendments may be found at, for example, paragraphs [0074], [0077] and [0080] and Figure 7.

Claims 18, 29 and 34 have been amended to remove indicators a), b), etc. before the elements set forth in claims 18, 29 and 34.

Claim 31 is amended to correct for typographical errors by removing the reference to the speed of light constant and by removing the symbol " Ω ", which unnecessarily indicates the units of impedance.

In the above-captioned Office Action, claims 11 and 12 are objected to for informalities. Claims 4, 11, 12, 21, 24 and 31 are rejected under 35 U.S.C. 112, second paragraph. Claims 1, 2, 5, 6, 13-19, 22, 23, 27 and 28 are rejected under 35 U.S.C. 102(e) as being anticipated by US Patent No. 6,853,939 to Coffeen. Claims 29, 30 and 32-35 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent No. 6,035,265 to Dister et al. The Examiner's objections will now be addressed.

Claim informalities

The Examiner objects to claims 11 and 12 for informalities, asserting that claims 11 and 12 improperly incorporate Figures 6 and 8 by reference. Applicant respectfully disagrees.

As the Examiner notes, incorporation by reference to a specific Figure or table "is permitted only in exceptional circumstances where there is no practical way to define the invention in words and where it is more concise to incorporate by reference than duplicating a drawing or

table into the claim. Incorporation by reference is a necessity doctrine, not for applicant's convenience." *Ex parte Fressola*, 27 USPQ2d 1608, 1609 (Bd. Pat. App. & Inter. 1993) (See MPEP 2173.05(s)).

The subject matter of claims 11 and 12 relate to using a circuit model, as shown circuit diagrams of Figures 7 and 8, of the electrical windings. Applicant submits that there is no practical way to define the circuit diagram shown in Figures 7 and 8 in words, and that it is more concise to incorporate Figures 7 and 8 by reference rather than duplicating these circuit diagrams in the claims. For this reason, claims 11 and 12 incorporate by reference Figures 7 and 8 out of necessity, and not for Applicant's convenience.

Applicant respectfully submits that the incorporation by reference of Figures 7 and 8 in claims 11 and 12 is permitted.

Indefiniteness of claims

Claims 4, 11, 12, 21, 24 and 31 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 4, 21 and 24, the Examiner objects to the term "about" as used in claims 4, 21 and 24. Specifically, the Examiner asserts that "the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The term 'about' makes it unclear what range of frequencies is used for the one frequency." Applicant respectfully disagrees.

The specification as originally filed sets forth, at paragraph [0123], that:

[0123] While the previously described embodiments of the present invention illustrate a low input signal frequency of 500 kHz, even lower input signal frequencies can be used to calculate the characteristic impedance of the electrical winding. The minimum frequency input signal that can be used for any given electrical winding will be dependent on the maximum length of the winding, which can easily be determined by any person of skill in the art.

One of ordinary skill in the art would recognize that minimum frequency used to calculate the characteristic impedance of the electrical winding may be lower than 500 kHz, depending on the length of the winding. Therefore, one skilled in the art would not be unclear what range of frequencies is used for the one frequency set forth in claims 4, 21 and 24.

Regarding claims 11 and 12, the Examiner asserts that it is unclear how the variables of the model relate to an electrical winding and it is unclear how the model relates to the drawings shown in Figures 7 and 8.

In response, claims 11 and 12 have been amended to define γ as the propagation constant. Other variables in the equations set forth in claims 11 and 12 are shown in the circuit diagrams explicitly shown in Figures 7 and 8. One skilled in the art would not be unclear how the variables of the models set forth in amended claims 11 and 12 relate to the drawings shown in Figures 7 and 8.

Regarding claim 31, the Examiner asserts that "claim 31 recites a limitation for a constant that defines the velocity of light in a vacuum. It is unclear how this constant is used in calculating the base characteristic impedance.". In response, claim 31 is amended to remove the constant that defines the velocity of light.

Applicant respectfully submits that claims 4, 11, 12, 21, 24 and 31 comply with 35 U.S.C. 112, second paragraph.

Claim rejections-anticipation

Claims 1, 2, 5, 6, 13-19, 22, 23, 27 and 28 are rejected under 35 U.S.C. 102(e) as being anticipated by US 6853939 (Coffeen). Applicant respectfully disagrees.

Applicant respectfully submits that independent claim 1 is patentable over Coffeen because Coffeen does not teach or suggest each and every element of independent claim 1. Specifically, Coffeen does not teach or suggest *a processing means for setting parameters of the electrical signal and for receiving the digital signals, the processing means calculating the characteristic impedance with the digital signals and the parameters of the electrical signals*

corresponding to one frequency, based on a transmission line model of the electrical winding, as set forth in independent claim 1.

In the above-captioned Office Action, the Examiner asserts that "Coffeen teaches a processing means for setting parameters of the electrical signal and for receiving the digital signals, the processing means calculating the characteristic impedance with the digital signals and the parameters of the electrical signals corresponding to one frequency based on a transmission line model of the electrical winding (Fig. 4, processor 406; pulse/signal voltage and width adjusters 408, 410; col. 18, lines 26-41)."

Applicant respectfully disagrees with the Examiner's characterization of the teaching of Coffeen, and submits that Coffeen does not perform any calculations based on a transmission line model of the electrical winding, nor does Coffeen even calculate a characteristic impedance of the electrical winding.

Coffeen discloses a method of determining abnormal windings in a transformer by comparing the characteristic signatures, $H(f)$, of windings having the same voltage. Coffeen discloses that the $H(f)$ of a winding is a frequency-domain data plot determined by inputting a pulse/signal into the winding and applying a fast-Fourier transform to the output signal. Coffeen discloses computing the difference between $H(f)$ functions of pairs of separate windings having the same voltage, and using the computed difference to identify asymmetries indicative of winding deformation, displacement, and/or insulation degradation (see column 6, line 52 to column 7, line 38). Accordingly, Coffeen determines a characteristic frequency response instead of a characteristic impedance of an electrical winding. Furthermore, Coffeen does not make any calculations based on a transmission line model of an electrical winding.

Nowhere does Coffeen teach or suggest *a processing means for setting parameters of the electrical signal and for receiving the digital signals, the processing means calculating the characteristic impedance with the digital signals and the parameters of the electrical signals corresponding to one frequency, based on a transmission line model of the electrical winding, as set forth in independent claim 1.*

Independent claim 1 is patentable over Coffeen because Coffeen fails to teach or suggest each and every element of independent claim 1. Dependent claims 2, 5, 6, 13-19, 22, 23, 27 and 28 include at least all of the elements of independent claim 1, and are patentable over Coffeen for at least the reasons that claim 1 is patentable.

Claim rejections-anticipation

Claims 29, 30 and 32-35 are rejected under 35 U.S.C. 102(b) as being anticipated by US 6035265 (Dister). Applicant respectfully disagrees.

Applicant submits that independent claim 29 is patentable over Dister because Dister fails to teach or suggest each and every feature of independent claim 29. Specifically, Dister fails to teach or suggest *calculating an approximate winding displacement from the difference value*.

In the above-captioned Office Action, the Examiner asserts that "Dister teaches calculating a difference between the current characteristic impedance and the base characteristic impedance and calculating an approximate winding displacement from the difference value (col. 12, line 66 - col. 13, line 8; Fig. 9, mechanical column)."

Applicant respectfully disagrees with the Examiner's characterization of the teaching of Dister.

Dister discloses a method of detecting a failure mechanism in the stator windings of an electric motor. The method comprises determining a baseline impedance of the stator windings, which may be a measured impedance value or a modeled value, and comparing a currently measured impedance value to the stored baseline impedance value. Dister discloses that if the difference between the baseline impedance and the measured impedance exceeds a tolerance, the motor is rejected. While Dister discloses that, "with certain failure mechanisms", the magnitude of the deviation indicates the amount of damage to the stator windings (see column 13, lines 18-24), nowhere does Dister disclose which failure mechanisms this applies to, or what is meant by the "amount of damage" that may be determined. In particular, Dister does not disclose or teach that an amount of winding displacement is determined.

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Therefore, Dister fails to teach or suggest *calculating an approximate winding displacement from the difference value*, as set forth in independent claim 29.

Independent claim 29 is patentable over Dister because Dister fails to teach or suggest each and every element of independent claim 29. Dependent claims 30 and 32-35 include at least all of the elements of independent claim 29, and are therefore patentable over Dister for at least the reasons that claim 29 is patentable.

The Examiner is invited to contact the undersigned by telephone or facsimile if the Examiner believes that such a communication may advance the prosecution of the present application.

Applicant respectfully submits that all rejections to the claims are traversed and a Notice of Allowance of claims 1 to 35 is hereby respectfully requested.

The Commissioner is hereby authorized to charge any additional fees, and credit any over payments, to Deposit Account No. 501593, in the name of Borden Ladner Gervais LLP.

Respectfully submitted,

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/Shin Hung/

By: _____

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